

BASIC ALGEBRA

NO. OF QUESTIONS	MAXIMUM DAYS	CLASS DURATION
12 Questions	1 DAY	2 HOURS

ADVANCED BOOK ASSIGNMENT QUESTION

Basic:

ADVANCED BOOK ASSIGNMENT QUESTION

Simplification chapter

GP:71,

AP:30, -----simplification chapter

Some Basic formulas for numbers:-

- Sum of the 1st n-numbers = $\frac{n(n+1)}{2}$
(1+2+3+.....n)
- Sum of 1st n-even numbers = $n(n+1)$
(2+4+6+8+.....2n)
- Sum of 1st n-odd numbers = n^2
(1+3+5+7+.....+(2n-1))
- Sum of 1st n-numbers square = $\frac{n(n+1)}{2} \times \frac{(2n+1)}{3}$
($1^2 + 2^2 + 3^2 + \dots + n^2$)
- Sum of 1st n-numbers cube = $\left\{ \frac{n(n+1)}{2} \right\}^2$
($1^3 + 2^3 + 3^3 + \dots + n^3$)

Arithmetical Progression (AP)

समांतर श्रेणी

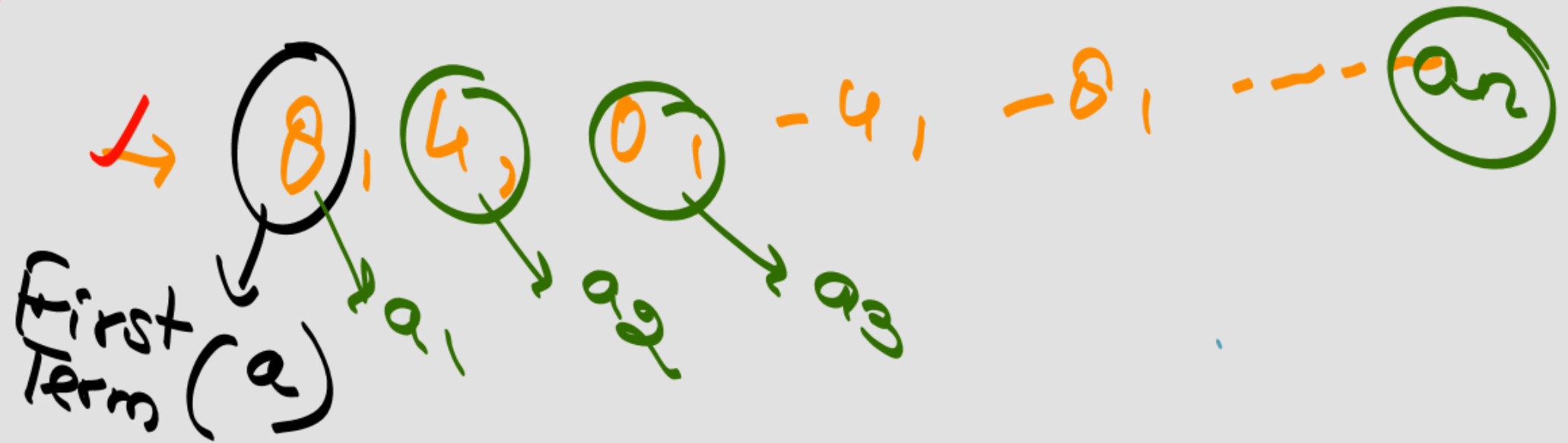
AP :-

if terms are written with

Common difference.

Example :- $4, 6, 8, 10, 12, \dots$

Common
difference
 $d = a_2 - a_1$



nth term in AP:-

$$a_n = a + (n-1)d$$

nth
term

first
term

no. of
term

Common
difference

$$\text{if } a = 5$$

$$d = -4$$

then find

Ans =

$$a_{20} = ?$$

$$a_n = a + (n-1)d$$

$$a_{20} = 5 + 19(-4)$$

$$5 - 76 = -71$$

$$\text{if } n = 20$$

$$a_n = 90$$

$$d = -2$$

then find $a = ?$

$$a_n = a + (n-1)d$$
$$90 = a + 19(-2)$$
$$90 = a - 38$$
$$a = 128$$

~~#~~ Sum of n -terms in AP :-

$2, 4, 6, 8$

a_n

$a_4 = 8$

$S_4 = 2 + 4 + 6 + 8$
 $= 20$

$[S_n]$
Sum of all Terms

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

or

$$\frac{n}{2} [a + l]$$

last Term

$$d = a_2 - a_1 = -3$$

of AP:-

18, 15, 12, ... a_{10}

$$S_{10} = \frac{n}{2} [2a + (n-1)d]$$

$$S_{10} = \frac{10}{2} [2 \times 18 + (9)(-3)]$$

$$5 [36 - 27]$$

$$= 5 \times 9 = 45 \text{ Ans}$$

$$\text{OR } \frac{n}{2} [a + \text{term}]$$

a_{10}

AP:- 80, 78, 76, - - - - - $d = -2$

$$a_{10} = ?$$

$$S_8 = ?$$

$$a_{10} = a + (n-1)d$$
$$= 80 + 9 \times (-2)$$

$$80 - 18$$

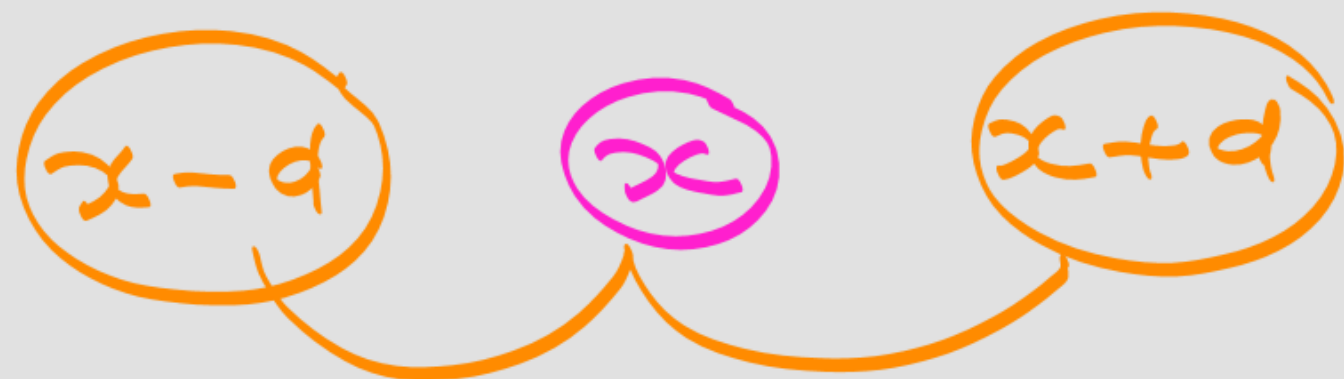
$$\underline{62}$$

$$S_8 = \frac{n}{2} [2a + (n-1)d]$$

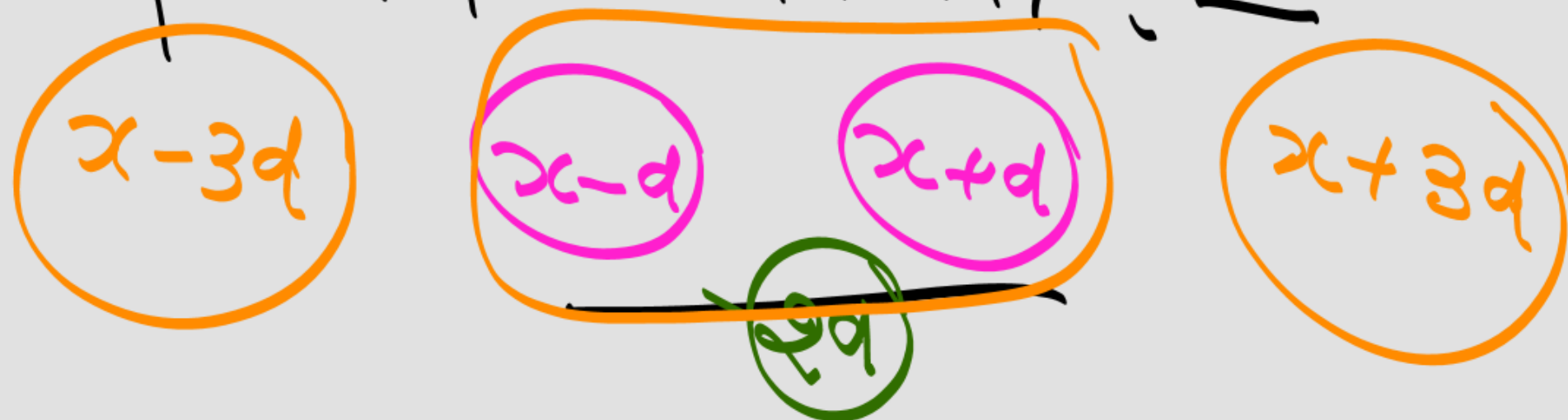
$$4 [160 + 7(-2)]$$

$$4 [160 - 14] = 4 \times 146 = 584$$

if 3 Term in AP :-



if 4 Term in AP :-



CLASS EXERCISE

A Number 720 is divided in 3 part in such a way that they are in AP. while the product of first and 2nd part while product of the second and third part are in the ratio 5:7. find the largest part ?

एक नंबर 720 को 3 भाग में इस तरह से विभाजित किया गया है कि वे समांतर श्रेणी में हैं। जबकि पहले और दूसरे भाग के गुणनफल जबकि दूसरे और तीसरे भाग के गुणनफल 5: 7 के अनुपात में हैं। सबसे बड़ा हिस्सा है?

200

these

240

280

none of

$$2x = 12$$

$$x = 6$$

$$(x-d)(x) = 5$$

$$(x)(x+d) = 7$$

6

1

40

$$720$$

$$x-d$$

$$x$$

$$240$$

$$x+d$$

$$3x = 720$$

$$x = 240$$

40

14

CLASS EXERCISE

A Number 20 is divided in 4 part in such a way that they are in AP. while the product of first and fourth part and product of the second and third part are in the ratio 2 : 3. find the largest part ?

एक संख्या 20 को 4 भाग में इस तरह से विभाजित किया गया है कि वे समांतर श्रेणी में हैं। जबकि पहले और चौथे भाग के गुणनफल जबकि दूसरे और तीसरे भाग के गुणनफल 2: 3 के अनुपात में हैं। सबसे बड़ा हिस्सा है?

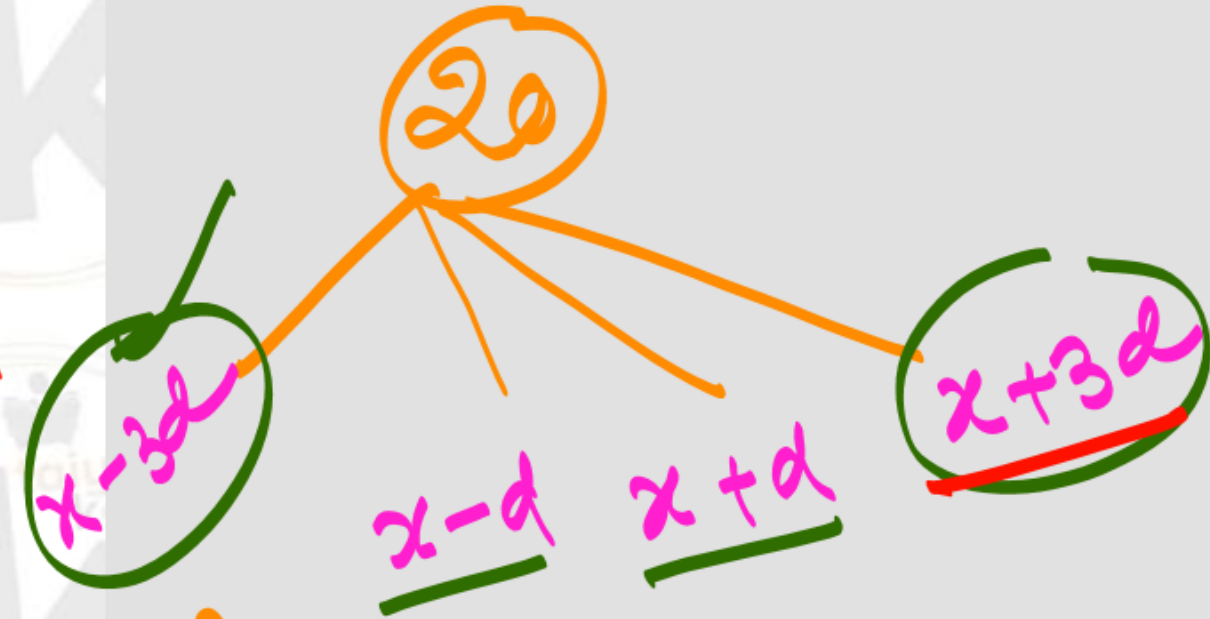
$$\frac{(x-3d)(x+3d)}{(x-d)(x+d)} = \frac{2}{3}$$

$$\frac{x^2 - 9d^2}{x^2 - d^2} = \frac{2}{3}$$

$$3x^2 - 27d^2 = 2x^2 - 2d^2$$

$$x^2 = 25d^2$$

$$d = \pm 1$$



$$4x = 20$$

$$x = 5$$

$$\begin{aligned} 1^{st} &= 5-3=2 \\ 2^{nd} &= 5-1=4 \\ 3^{rd} &= 5+1=6 \\ 4^{th} &= 5+3=8 \end{aligned}$$

Geometrical Progression (GP)

गुणोत्तर श्रेणी

GP:

if terms are written with

Common ratio

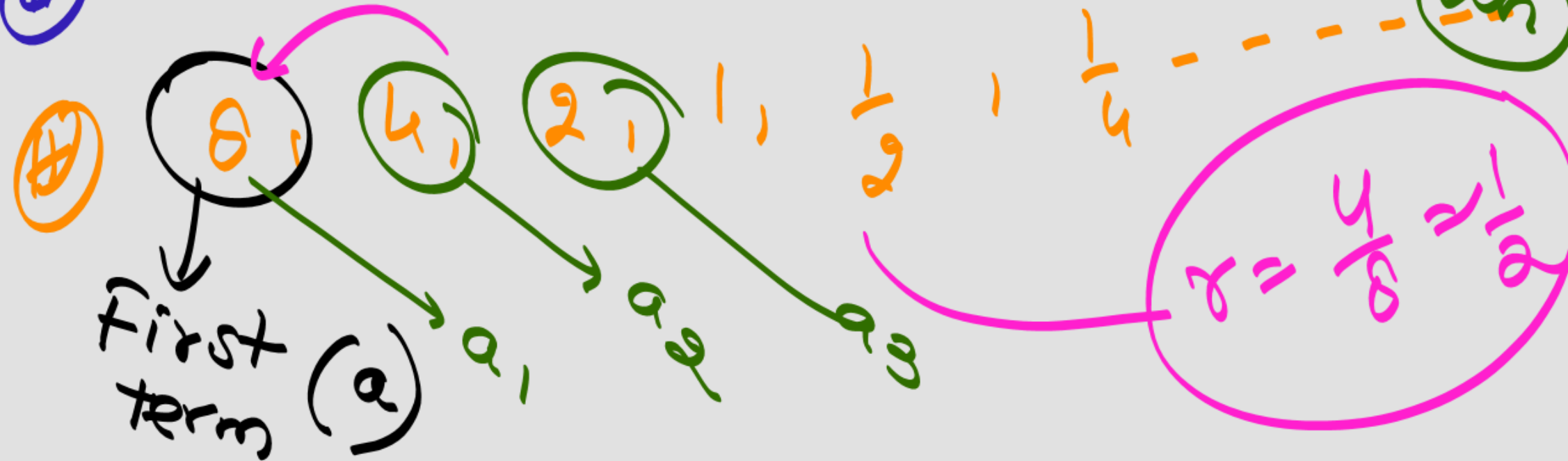
$$r = \frac{6}{2} = 3$$

Ex:-

① 2, 6, 18, 54, - - - - -

Common ratio

$$r = \frac{a_2}{a_1}$$



n^{th} term in G.P.:-

$$a_n = a \cdot r^{n-1}$$

a
1st Term

$r \rightarrow$ Common ratio

Ex:

$$a = 2$$

$$r = \frac{1}{2}$$

$$a_{10} = ?$$

$$a_{10} = a \cdot r^{n-1}$$

$$\Rightarrow 2 \times \left[\frac{1}{2} \right]^9$$

$$\cancel{2} \times \frac{\cancel{1}}{\cancel{2}^9} 2^9$$

$$\cancel{2} \times \frac{\cancel{1}}{\cancel{2}^9} 2^9$$

$$\cancel{2}$$

if $a = 3$
 $r = \frac{1}{3}$
 then find

$$a_{10} = a \cdot r^{10-1} = 3 \times \left(\frac{1}{3}\right)^9 = \frac{1}{3^8}$$

if AP -
 $a = 1$
 $r = \frac{1}{2}$

1, $\frac{1}{2}$, $\frac{1}{4}$, ...

$$a_{10} = ?$$

$$a_{10} = a \cdot r^{n-1}$$

$$= \frac{1}{2^9} \times \left(\frac{1}{2}\right)^9$$